

REMARKS

Claims 1-18 are pending in this application. Claim 1 is the independent claim.

I. Priority Document:

Applicants respectfully request acknowledgement of receipt of the certified copy of the foreign priority application from which this application claims priority under 35 U.S.C. §119. A certified copy of JP 2004-096848 was forwarded to the USPTO from WIPO and a copy is available at USPTO PAIR website.

II. Claim Rejections -35 U.S.C. § 102/103:

Claims 1-18 are rejected under 35 U.S.C. §102(a) as being anticipated by, or in the alternative, as obvious over WO 2005/007770 to Chu (Chu). The rejection is respectfully traversed.

Chu fails to disclose or suggest each and every feature recited in the rejected claims. For example, Chu fails to disclose or suggest, a semiconductor polishing composition, comprising fumed silica, the semiconductor polishing composition being an aqueous dispersion solution of fumed silica, wherein a content of the fumed silica having a particle diameter of 100 nm or less is 15% by volume or more based on a total amount of the fumed silica.

Chu relates to an abrasive composition for polishing substrates, including a plurality of abrasive particles having a polydisperse particle size distribution with median particle size, by volume, being about 20 nm to about 100 nm. The fraction of particles greater than about 100 nm is less than or equal to about 20% by volume of the abrasive particles (paragraph [0015]). Chu uses a colloidal silica as being “particularly suitable” for the invention as a polydisperse colloidal silica (paragraph [0027]). Suitable distributions of the polydisperse colloidal silica are such that the median particle size, by volume is about 20 nm to about 100 nm; the span value, by volume, is greater than or equal to about 15nm; and the fraction of particles greater than 100 nm is less than or equal to about 20% by volume of the abrasive particles. The distribution has a relatively broad span including particles that are relatively large (e.g., above 100 nm). Such large particles contribute to scratching and the appearance of defects on the surface of the substrate subsequent to the CMP process. Additionally, the presence of a significant quantity of large particles (e.g., greater than 100 nm) in the dispersion may result in settling during storage (paragraph [0027]). Even in a most preferred

embodiment, Chu includes a fraction of particles that is greater than 100 nm by volume (see paragraph [0028]). Thus, unlike the semiconductor polishing composition recited in rejected claims, Chu teaches the use of a colloidal silica that has particles greater than 100 nm. As such, Chu demonstrates the problems being addressed in the instant application due to use of a colloidal silica.

Accordingly, Chu teaches the use of a colloidal silica and not a fumed silica, as recited in the rejected claims. For example, Chu, at paragraph [0051] demonstrates the preferred use of a colloidal silica when compared to otherwise identical slurries containing precipitated silica, fumed silica and colloidal alumina. For example, paragraph [0052] summarizes the results of Table 1 as clearly showing “that the polydisperse colloidal silica provides the greatest removal rate while providing a polished surface quality that is superior (smoother) than that achieved with the other three abrasives.” Accordingly, contrary to the allegation in the Office Action, Chu actually teaches away from the use of fumed silica and therefore does not anticipate or render obvious the rejected claims. As such, withdrawal of the rejection is respectfully requested.

Claims 1-3, 5-8, 12, 13, 15, 16 and 18 are rejected under 35 U.S.C. §102(a) as being anticipated by or in the alternative as obvious over US 2004/0040217 to Takashina et al. (Takashina). The rejection is respectfully traversed.

Takashina fails to disclose each and every feature recited in rejected claims. For example, Takashina fails to disclose or suggest, a semiconductor polishing composition comprising, fumed silica, the semiconductor polishing composition being an aqueous dispersion solution of fumed silica, wherein a content of the fumed silica having a particle diameter of 100 nm or less is 15% by volume or more based on a total amount of the fumed silica.

Takashina relates to a polishing composition for polishing semiconductor substrate (paragraph [0002]). Like Chu, Takashina also discusses disadvantages in the use of fumed silica as a polishing particle (paragraph [0005]). Therefore, Takashina teaches the use of abrasive particles that may include, for instance, inorganic particles including particles of metals, carbides of metals or metalloids, nitrides of metals or metalloids, oxides of metals or metalloids, borides of metals or metalloids, diamond, and the like. Examples of the inorganic particles may include particles of dioxide, aluminum oxide, cerium oxide, titanium oxide, zirconium oxide, silicon nitride, manganese dioxide, silicon carbide, zinc oxide, diamond and magnesium oxide. Among the inorganic particles, examples, of silicon dioxide particles

include colloidal silica particles, fumed silica particles and surface-modified silica particles (paragraphs [0035], [0036]).

As clearly stated in Takashina, among the inorganic particles, colloidal silica particles are the most preferable and can be prepared as a raw material (paragraph [0037]). Thus, contrary to the allegation in the Office Action, Takashina does not disclose or suggest a semiconductor polishing composition comprising fumed silica having a particle diameter of 100 nm or less. Rather, Takashina teaches a polishing composition having abrasive particles that may include among other thing, metals, carbides, nitrides, borides, diamond, and the like. There is nothing in Takashina that discloses or suggests the use of fumed silica particles in the amounts and sizes as recited in the rejected claims. Rather, Takashina merely discloses the use of abrasive particles and more preferably discloses the use of colloidal silica particles and therefore merely demonstrates the problems being addressed in the present application due to the use of colloidal silica.

Moreover, the use of abrasive particles in the embodiments described in Takashina indicates that the abrasive particles have a size of 2 to 200 nm in an amount of 50% by volume or more. As indicated in the Background Section of the present application, use of colloidal silica is relatively slow in polishing speed and therefore presents a problem due to the length of time required to polish a wafer. Further, as noted in the Background Section of the present application, colloidal silica is industrially produced as a raw material and therefore contains impurities, such as sodium, which are likely to contaminate a semiconductor wafer at the time of polishing. As Takashina merely demonstrates the problems being addressed in the present application and fails to disclose or suggest each and every feature recited in the rejected claims, withdrawal of the rejection is respectfully requested.

III. Claim Rejections- 35 U.S.C. §103:

Claims 4, 9-11, 14, and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Takashina. The rejection is respectfully traversed.

Claims 4, 9-11, 14 and 17 are allowable for their dependency on independent claim 1 for the reasons discussed above, as well as for the additional features recited therein. For example, Takshina fails to disclose or suggest a particle size distribution by volume of fumed silica, the semiconductor polishing composition has a particle size of maximum frequency in a range of 80 to 115 nm. Rather, Takashina merely discloses particle sizes for colloidal silica

and fails to disclose or suggest a polishing composition having fumed silica with particle sizes in the frequency range recited in the rejected claims. Accordingly, withdrawal of the rejection is respectfully requested.

CONCLUSION

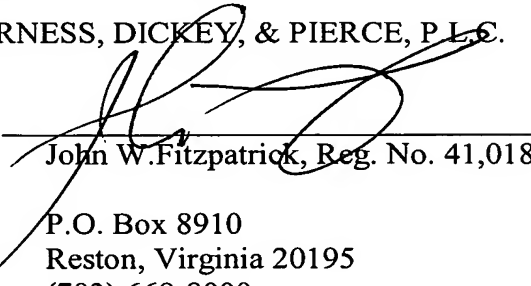
In view of the above, Applicants earnestly solicit reconsideration and allowance of all of the pending claims.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) hereby petition(s) for a three (3) months extension of time for filing a reply to the Office Action and submit the required \$1,050.00 extension fee herewith.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,
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